

Global trends in energy production & consumption: an outlook for energy security & governance

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CENTER FOR ENERGY,
MARINE TRANSPORTATION
AND PUBLIC POLICY

The writing on the wall...

“
The world’s energy system is at a crossroads.
Current trends in energy supply and
consumption are patently unsustainable --
environmentally, economically, socially. But that
can – and must – be altered; there is still time to
change the road we’re on”

IEA, World Energy outlook 2008, p.3

Defining 'energy security': the '3As' view

- Availability
- Access
- Affordability



Defining 'energy security': other perspectives to incorporate

- 'Independence from Middle Eastern oil'
- 'Security of demand'
- Environmental & climate security
- Eliminating 'energy poverty'

Defining 'energy security': Brenda's definition

- Reliability
- Affordability
- Environmental friendliness



Four insightful ADA break-out groups

- Group 1: how customer and producer countries concepts of security overlap at the center of the 'butterfly' diagram --Transportation, Environment, Predictability & Politics, as well as the more diffuse quest for sustainability and happiness...
- Group 2: ... and how countries need to combine flexibility and adaptability with predictability to adapt and prosper in the great '-ity' world
- Group 3: the community of stakeholders –government, companies, end users, NGOs, media etc-- that lies below the apparently simple 'A to B' diagram
- Group 4: the value chain that takes energy not just from A to B but from upstream to downstream –and then to broader economic diversification and the broader portfolio of risks and opportunities in which 'security' resides.

**Energy security in a global economic
perspective:**

**SOME ASPECTS OF THE ‘ AVAILABILITY’
DIMENSION**

Energy Security

The 'Availability' dimension

- Demand side:
 - Unprecedented, even if bumpy, **economic growth**
 - **China** and the BRICs climbing the 'energy ladder'
 - The global middle class... and the energy-poor billion
 - EU pioneering efforts to transform energy uses towards a **low-carbon economy**
 - **President Obama's** policies now embracing energy efficiency and climate change mitigation
- Supply side:
 - 'Peak Oil'?
 - The investment gap

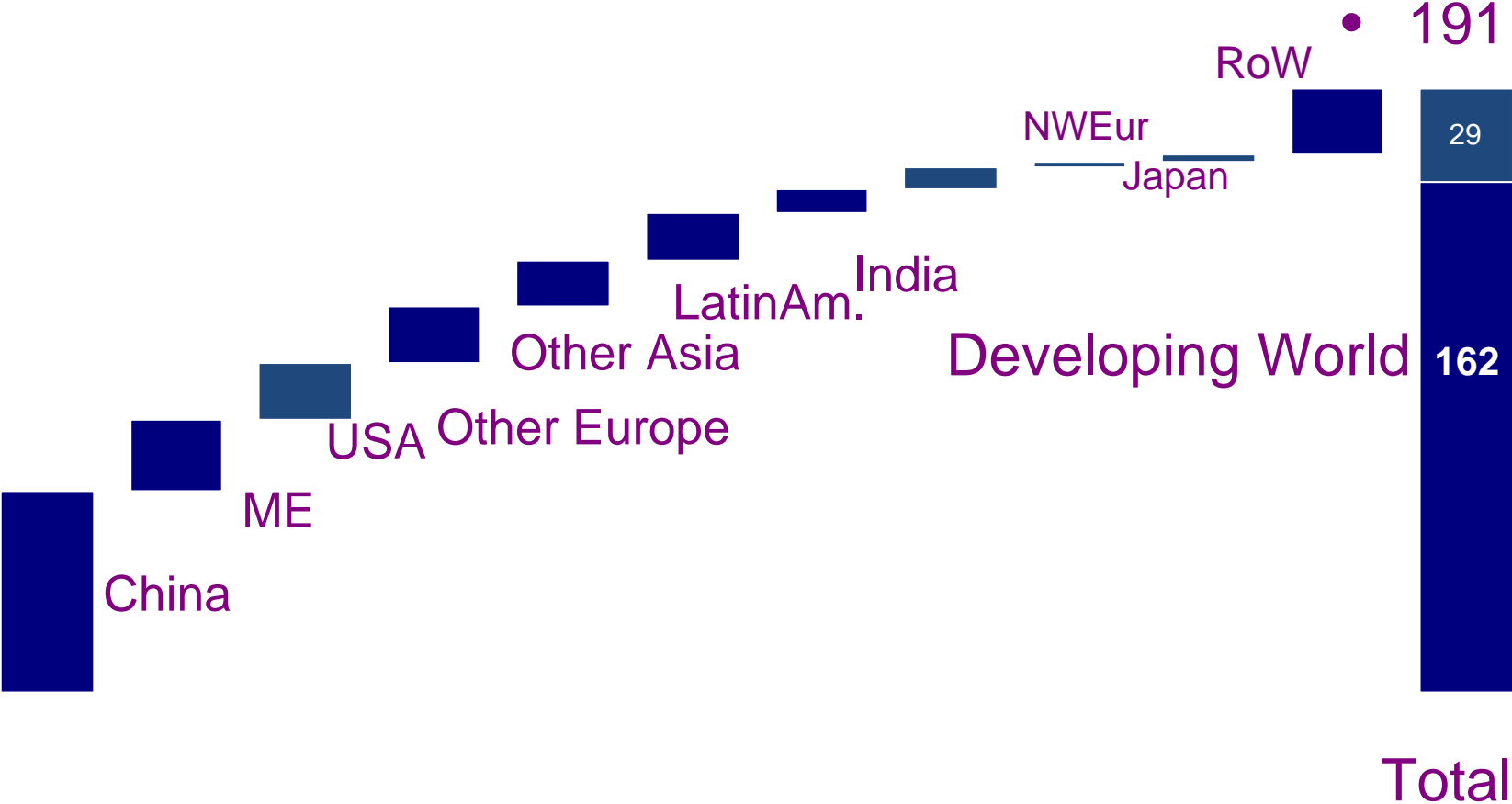
Energy Security: The 'Availability' dimension

1. The demand side.

Global perspective, and Chinese and US energy policies



End-use energy demand growth, 2003–2020, by region (McKinsey)



Source: MGI Global Energy Demand Model, in QBTU, % of total

Energy and climate at the center of President Obama's policy agenda

“In the 21st Century, we know that **the future of our economy and national security** is inextricably linked with one challenge: **energy**.

All of us know the problems that are rooted in **our addiction to foreign oil**. It constrains our economy, shifts wealth to hostile regimes, and leaves us dependent on unstable regions.

These urgent dangers are eclipsed only by **the long-term threat of climate change**, which, unless we act, will lead to drought and famine abroad, devastating weather patterns, and terrible storms on our shores, and the disappearance of our coastline at home.”

President elect Obama, news conference, Chicago, December 15, 2008

The Chinese thirst for energy

- Chinese oil demand to **grow at 4%/y to 10mbd in 2013** (8.25mbd in 2008), with **domestic production** growing from 3.80 to 3.95mbd and **imports** reaching 6.08mbd (4.45 in 2008)
- Natural gas now only 3.5% of total primary demand. Consumption to increase **from 67bcm (2007) to 120bcm** at least in 2013, with production rising to 96bcm (BMI, Feb09).
- Domestic oil & gas pipelines to be increased from 48,000km to 150,000km over 12 years (Xinhua, Jan09)>
 - **Second West East pipeline to come on stream in 2011, transporting Turkmen gas, with Junggar basin pipeline providing additional resources**
 - **Construction of third West East pipeline has begun, to transport gas from a yet unidentified Central Asian source**

Beyond coal: China as a renewable energy leader (1)

- The objective set in 2008 of 5,000 MW of wind power installed in 2 years became more than 15,000 MW. **The target of 30,000 MW set for 2020 will be reached by end of 2010.**
- China installed **more wind power in 2008 than the U.S.** Six super Wind farms, including in the Gobi desert, “dwarf anything else, anywhere else in the world” (Steve Sawyer, SG of Global Energy Council Brussels)*
- Infrastructure bottlenecks: on windiest day, only half of Chinese wind electricity can be transported.

* IHT July 3, 2009, p. 1 and 14.

Beyond coal: China as a renewable energy leader (2)

- **Hydro and nuclear** account for 21% and 1.1%
- In Sept 2007, the government required all large power producers to **generate 3% of their electricity from non-hydro renewables** by 2010, and 8% by 2020.
- **Rapid progress on solar energy:**
The 10MW Dunhuang PV solar power plant awarded at 16 cent / KWh (real price around 23 cents), to compare with 7 cents for wind (vs. 10 cents in 2007) and 4- 5 cents for coal.
- Coal-fired plants still central, although new builds now halved to one per week. Some of the most efficient installations in the world Old plants retired,.

China's resource acquisition drive

- CNPC present in 26 countries,
- Through formal and informal channels, Chinese companies report to government, for whom resource acquisition is key driver.
- Chinese companies accept **Service Contracts & Buy Back** contracts
- '**Loan for oil**' policy, with Russia (\$25bn), Brazil, Kazakhstan...
- Part of China's **\$2 trillion forex** assets is being transformed into commodity assets

Chinese energy security and the broader 'peaceful rise' of China

- Chinese energy companies encouraged to act independently and compete fiercely, yet the listed companies (e.g. PetroChina) remain affiliates of the **State companies**
- U.S. embargos and blacklisting opens important doors to Chinese companies (**Iran, Sudan, Myanmar...**)
- CNPC also first foreign company to be accepted in Iraq, for **Ahdab field**, accepting to transform a Saddam Hussein era PSA into a 20y Service Contract (projected production of 115,000b/d)
- Infrastructure investments to reduce vulnerability: **Myanmar oil pipeline** will bypass the Malacca straight and reduce transit time for ME oil. It goes hand in hand with the gradual build up of **Chinese naval capacities** and bases (Gwandar)

China energy security (2)

- CNPC holds 85% of **AktobeMunaiGas** and acquired 67% of Canada-listed **PetroKazakhstan** (Kazakhstan then made such transfers of ownership conditional upon Kazakh approval).
- SINOPEC in the process of a **\$7.2bn acquisition of Addax**, a Swiss-Canadian company active in West Africa and one of the two most significant investors in Iraqi Kurdistan.
- Chinese bad experiences with US (**Unocal**) and Australian (**Rio Tinto**) public opinion and legislature set some provisional limits that will be tested when the time comes.
- Acquisition of energy assets **-\$46bn as of April09-** also serves an implicit purpose of **diversifying Chinese gigantic forex reserves** away from the U.S. dollar into commodities.

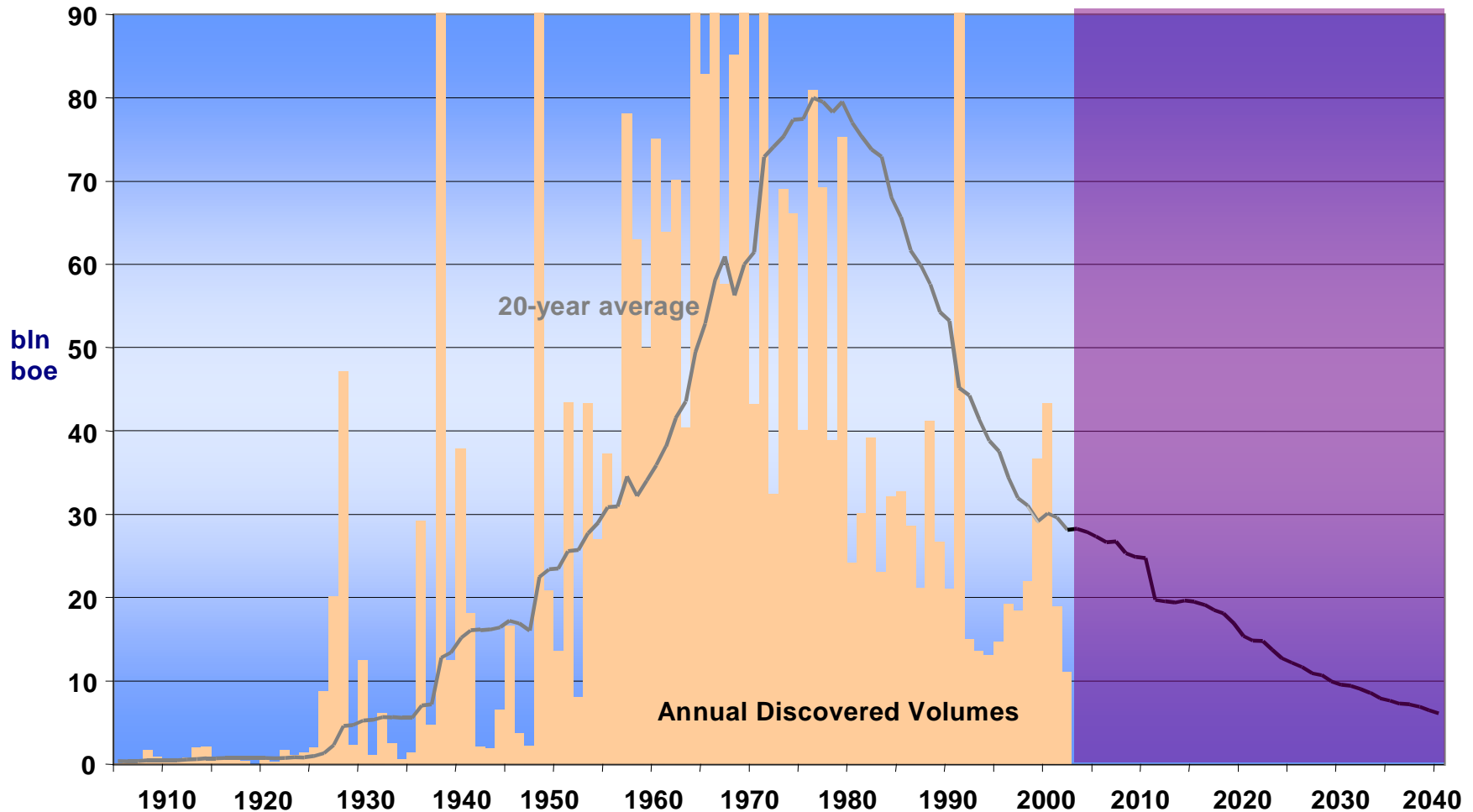
Energy Security: Availability

2. The supply side.

The peak oil debate, and the peak oil mindset

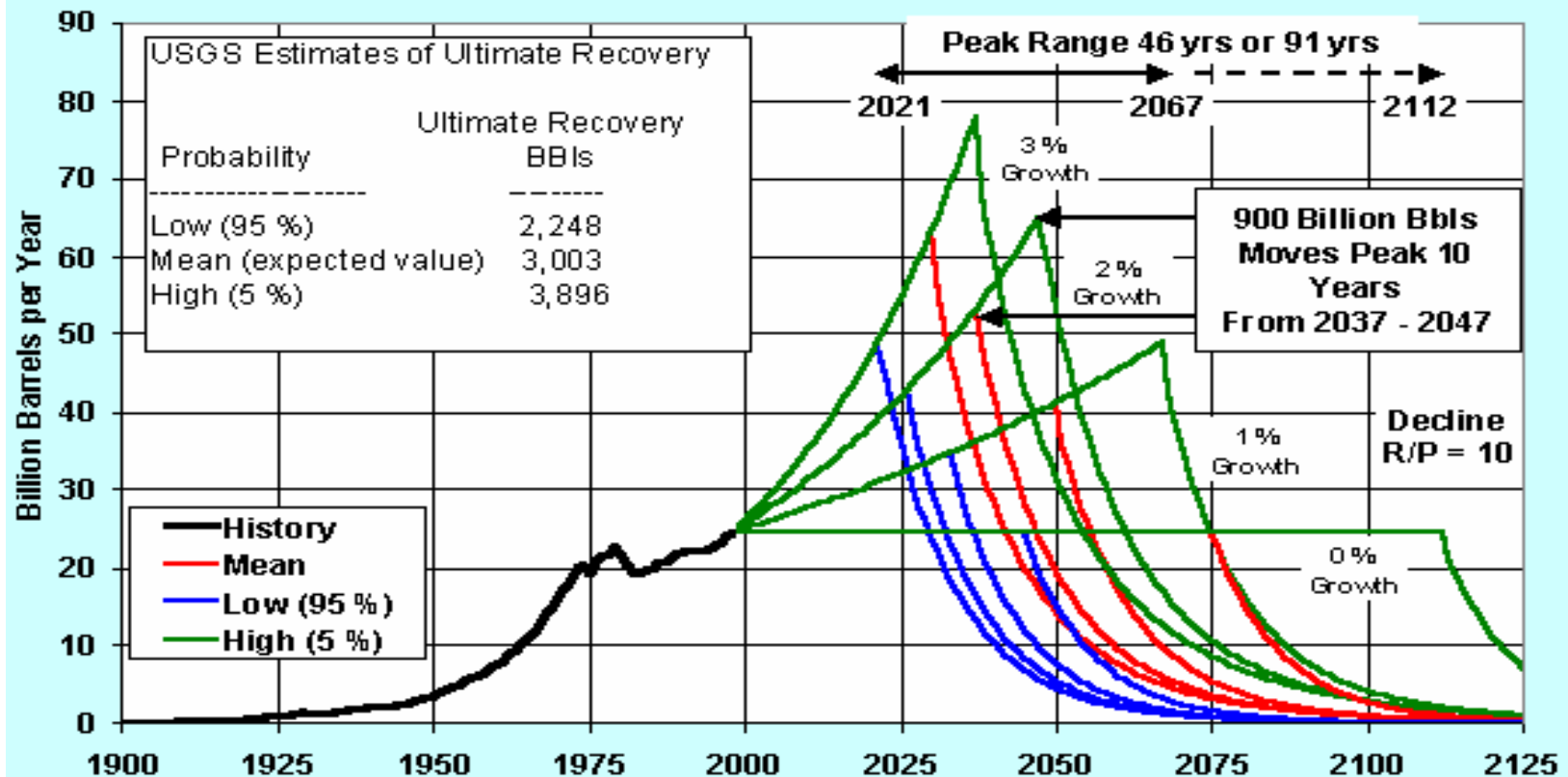


'Peak oil' : Hubbert meets Gauss



2020 or 2100: pick your peak

12 EIA World Conventional Oil Production Scenarios



Note: U.S. volumes were added to the USGS foreign volumes to obtain world totals.

Energy security in a global economic perspective:

REFLECTING ON THE ROLE OF OPEC IN OIL PRICE FORMATION –IN COMPANY OF ROBERT MABRO please go to www.robertmabro.co.uk

Oil price formation, 1960s-1985

- 1960s : OPEC as Trade Union, with companies setting prices.
- 1973 to 1985 OPEC determined the price of Arabian Light 34°API as the reference for international transactions. OPEC was a price maker and volume taker—not a cartel
- 1979-81, tight oil supply/demand balance pushed market prices above those fixed by OPEC. The market was leading, yet OPEC was universally blamed for this second price shock.
- 1982-85 OPEC acted as a cartel, reducing production to counter a massive drop (30mbd to 16mbd) in demand for its crude, but failed (KSA production reduced from 10mbd to 3mbd)

Oil price formation since 1986

(Robert Mabro, Nov. 2008)

- “OPEC took the view after the catastrophic 1986 events that it could no longer administer the oil price. It will instead follow the market by using market-related formulae to price its oil in exports. This is where we are now.”
- “OPEC cannot directly get the market deliver its preferred price. It is essentially a price taker who tries to signal to the market to stop a price decline ...

...The only signal it can use is the decision to reduce production quotas. Markets can receive the signal and act upon it or simply ignore it and indulge in skepticism.”

Using the term 'cartel' in its proper economic context

- “Since 1973, the year of the first oil price hike imposed unilaterally by OPEC, this organization ... has been continually labeled a ‘cartel’.... labels are the enemies of research, of serious attempts for better understanding”. (Mabro, 2008)
- “To the extent to which OPEC uses production as an instrument to influence prices the cartel characterisation applies. But the episodes when this behaviour has been effective were rare and usually of short duration.” (Mabro, 2004)

Robert Mabro on when OPEC is –and is not-- a cartel

- “An oil price rise is not a proof that a cartel is in operation. A price fall due to a price war is an unmistakable sign that a cartel is inexistence. And one always needs to remember that the market plays a major role, and that is strong when it is considered weak and weak when it is believed to be strong.
- Since OPEC does not fix the oil price but is always very concerned about its level and movements it can only attempt to steer their course by sending signals to the futures markets where reference prices are determined. The signaling device is announcements about production policy.”

Robert Mabro on when OPEC is –and is not-- a cartel (2)

- Part of the oil price problem arises in the USA. Insufficient refining capacity, multiplication of different gasoline specifications, a Middle East policy that aggravates the instability of the region and a hysterical and uncritical discourse about Saudi Arabia that affects the credibility of its intentions on oil policy.

There is little that OPEC can do on these fronts.

- OPEC today needs to remember however that it is powerless in a tight market. The potential power of OPEC only exists when the market is slack, that is when everybody believes that OPEC is weak

Global trends in energy production & consumption

CASE STUDY:

Energy security & governance for Eurasian gas relations

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CASE STUDY Eurasian gas relations

1. Natural gas and the global energy balance
2. Natural gas as a key vector in EU-Russia relations
3. EU energy policy: the first 7 years, and beyond
4. From cold war to pipelines war?

Energy security & governance for Eurasian gas relations

1. Natural gas and the global energy balance

A new golden age for natural gas?

- Fuel of choice of the 1990s, gas is now winning back from coal in the US and Europe as a result of concerns for **climate change** (gas emits **half the amount of CO₂** per unit of energy output)
- Gas **24%** of EU's primary energy consumption in 2006 and growing
- Of the **372 power plants** expected to be built **in the US** over the next 3 years, **206** will be gas-fired vs. only **31** coal fired (EIA, April 30 #14)
- 3.2% of **China's** primary energy consumption in 2008, LT Energy Development Plan of Dec. 2007 sets objective of **12.5% by 2020**

Gas role in meeting energy demand growth (2006 – 2030, %)*

Region	TPES**	Coal	Oil	Gas
World	1.6	2.0	1.0	1.8
OECD Europe	0.3	-0.5	-0.4	1.0
Eastern Europe/Eurasia	1.1	1.0	0.9	0.9
OECD Pacific	0.5	0.1	-0.6	1.5
Non-OECD Asia	2.8	3.1	3.0	3.6
(China)	(3.0)	(3.0)	(3.6)	(5.8)
(India)	(3.5)	(4.1)	(4.0)	(4.8)

* Source: IEA World Energy Outlook 2008, IEA Reference Scenario

** TPES=Total Primary Energy Supply

...yet a natural gas surplus that contrasts with firming oil markets

- Demand for gas in Europe to fall by 10% in 2009**
- Beyond temporary factors (e.g. consumers waiting for past drops in oil prices to be reflected in indexed gas prices), CERA sees a 16% fall in EU gas consumption by 2020 and a 35% drop by 2035 if the EU renewables and energy efficiency targets are met and oil and gas prices rebound .
- With Barnett Shale and Haynesville Shale the US is now “swimming in natural gas” *

* WSJE 5/5/09 ** HIS Global, 5/25/09

‘Gas as the energy source for the
future’
and yet presently
‘too much gas’, and not enough
‘security of demand’



Energy security & governance for Eurasian gas relations

2. Natural gas as a key vector for EU-Russia relations

Gas a driver in the relations between the two halves of Europe

- Cold war, **détente**, and the Europe-US dispute over accepting the vulnerabilities implied in the supply of Soviet gas through the Urengoy pipeline
- **The Yeltsin** era exuberance: Sakhalin, Kovykta, TNK-BP... gas as a foundation for East-West integration
- **Baku-Tbilisi-Ceyhan (BTC)** and **Baku-Tbilisi-Erzurum**: great commercial and technical achievements --with a risk of re-igniting the cold war spirit
- Putin, **Gazprom**, Medvedev, Novatek and the role of gas in Russian domestic matters and diplomacy

... and yet the EU-Russia 'common space' that is not

- The post 1989 NATO and EU 'partnerships'
 - The 'four common spaces'
 - The Energy Charter Treaty
- and then,*
- The growing Russian feeling that EU and NATO were expanding at Russia's expense
 - The Ballistic Missile Defense straight-in-your-face
 - The reassessment of Russia's relations to the West in Putin's second presidential mandate

EU-Russia relations: ambiguities feeding distrust and vulnerabilities

“With Russia’s relations with the West having ceased to be those of a **quasi-alliance** but neither having relapsed to a **confrontation**, a new model of interaction is in order.

Clearly competitive, but not exactly adversarial; nonhierarchical, but among players of a very different international ‘weight’; sharing some of the basic goals, but still **bitterly divided** on some **values** and the **patterns of international behavior**.

In this situation, some issues may spark **real showdowns**.”

Dmitri Trenin, Deputy Director, Carnegie Moscow Center, “Toward A New Euro-Atlantic ‘Hard’ Security Agenda: Prospects for Trilateral U.S.-EU-Russia Cooperation”, p. 4

Russian apprehensions regarding subsoil resources

“Russian resources are a God-given that should be used effectively... Somebody is always wanting to take them away.”

Deputy Prime Minister Igor Sechin, *WSJ*, March 31, 2009, p. 3.

Gazprom as architect for the Eurasian energy space

Definition / enforcement of jurisdictional boundaries:
Sakhalin, Kovykta...

- Shaping the architecture for physical flows of gas:
Blue Stream, Nord Stream, South Stream
- Organizing the Eurasian gas market-place: JVs with OMV for Baumgarten, with ENI for subsea gas pipelines...
- Influencing Eurasia links to other key gas markets: pipeline diplomacy in Algeria, Libya, Nigeria, Iran...

Energy security & governance for Eurasian gas relations

3. EU energy policy: the first 7 years, ... and beyond

Energy at the heart of the contemporary EU integration agenda

“Energy has become an issue of integration and disintegration of the EU and perhaps will turn out to be **the ultimate Litmus test of political and economic unity in the EU ”**

Jacques de Jong & Coby van der Linde, “EU Energy Policy in a Supply-constrained World”, Swedish Institute for European Policy Studies, p.3.

2000-2008: a fast (**yes!**) journey from ‘no EU energy policy’ to an EU energy market & policy

- Energy excluded from the ‘**internal market**’ of ‘Europe 1992’. The 2000 Lisbon summit turning point.
- **Liberalization Directives** of 1996, 2003, 2009*
- The debate over network unbundling
- The December 2008 **energy & climate package**

Has the EU fully considered the **external dimension?**
(analysts who think that the EU does not have an ‘energy policy have this external dimension in mind, notably relations with Russia)

One EU energy policy, three objectives

- **Competitiveness**, at the heart of the year 2000 Lisbon program.
- **Sustainable development**, an essential concern behind the December 2008 'Energy and Climate' package and the massive reduction in carbon emissions it seeks,
- **"Security of supply"**, the most recent objective, hard to define absent a true Common Foreign and Security Policy (CFSP) and the Lisbon European Constitution (sorry, the Lisbon Treaty) presently ratified by 24 EU member countries and dependent on notably the second Irish referendum of Fall 2009 --itself a tribute to the development of a genuine 'public space' in the Union.

The (still pending) third “energy package”: when ‘boundaries’ and ‘control’ issues come back

- “**Protection clause**”: EU member states allowed to block takeovers of disintegrated system operators or power and gas suppliers (subject to European Commission approval)
- “**Gazprom Clause**” prevents non EU energy companies, such as Russia's state-owned Gazprom, from buying up distribution networks without agreement at a political level (**national** and not EU level at Germany’s request)
- The **U.S. and IEA** step into the debate, and **NATO** seeks a role:
 - “No legitimate interest is served when oil and gas become tools of **intimidation or blackmail**, either by supply manipulation or attempts to **monopolize transportation**”

in Vice President Cheney, reacting to Gazprom’s April 18 press release speech to East European leaders in Lithuania, May 2006.

Energy security & governance for Eurasian gas relations

The EU long term integration drive and its implications for the Eurasian energy scene



Russia testing the economy-centric view behind the EU energy liberalization drive

“[The EU was of] the view that **international markets would become dominant and efficient way to connect demand and supply in the world.** With that expectation came the underlying assumption that private companies would be the main players in the international energy arena.

This idea was mainly based on the **expectation that the resources of the FSU would become available for foreign direct investments** of private international oil companies and the they would this be able to create a **counterweight** to the impending market power of the NOCs of the OPEC and some other countries, where IOCs could not access new reserves.”

Jacques de Jong & Coby van der Linde, “EU Energy Policy in a Supply-constrained World”, Swedish Institute for European Policy Studies, p.5.

Gazprom adapts to EU energy liberalization

EU Market liberalization creates major uncertainties for non-EU gas suppliers. Gazprom response has followed standard economic thinking:

- Gain **direct access to consumers** through acquisition of transportation and downstream assets
- diversify **contractual portfolio** (shorter term contracts, spot markets...)
- diversify destinations to **non-EU markets** (with US market raising the **LNG prerequisite**)
- invest outside of Russia to **diversify reserve base.**

Gazprom well positioned to become an eminent **'I-NOC'**.

The EU Commission's DG COMP's short-term traders' policy bias

“
It is worth noting that the **liberalization** of markets and the **ban on long-term contracts** are two separate things, bound **only** by the fact that the **European Commission** considers long-term contracts to be detrimental to competition.”

Catherine Locatelli, “EU Gas Liberalization as a Driver of Gazprom’s Strategies?”, Russie.Nei.Visions n26, February 2008, p. 11

-The initial choice by the EU Commission of **one unbundling model** was similarly discretionary.

- Unlike the US, the EU is still an incomplete institutional construct. The role of competition policy in a comprehensive EU policy mix still needs to be articulated.

Sagol!

